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FEB 3 - 1965

CURRENT SERIAL RECORDS

WATER SUPPLY OUTLOOK
and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS
for
MONTANA

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE.
and
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with Federal, State, and private organizations listed on the inside back cover of this report.

AS OF
JAN. 1, 1965

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Soil Conservation Service, 511 N.W. Broadway - Room 507, Portland, Oregon 97209.

PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
RIVER BASINS			
WESTERN UNITED STATES	MONTHLY (FEB.-MAY)	PORTLAND, OREGON	ALL COOPERATORS
BASIC DATA SUMMARY	OCTOBER 1	PORTLAND, OREGON	ALL COOPERATORS
STATES			
ALASKA	MONTHLY (MAR.-MAY)	PALMER, ALASKA	ALASKA S.C.D.
ARIZONA	SEMI-MONTHLY (JAN.15 - APR.1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (JAN.-JUNE)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
MONTANA	MONTHLY (JAN.-JUNE)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
NEVADA	MONTHLY (JAN.-MAY)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-JUNE)	PORTLAND, OREGON	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH	MONTHLY (JAN.-JUNE)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-JUNE)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	WATER RESOURCES SERVICE, DEPT. OF LANDS, FOREST AND WATER RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.

WATER SUPPLY OUTLOOK
FEDERAL-STATE-PRIVATE COOPERATIVE SNOW SURVEYS
for
MONTANA

Report Prepared
By
Phillip E. Farnes
and
Stanley E. Cook

Snow Survey and Water Supply Forecasting Section
Soil Conservation Service
Box 855
Bozeman, Montana

Issued By

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Montana Agricultural
Experiment Station
Bozeman, Montana



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LIST OF COOPERATORS	Inside Back Cover

MONTANA
WATER SUPPLY OUTLOOK
as of
January 1, 1965

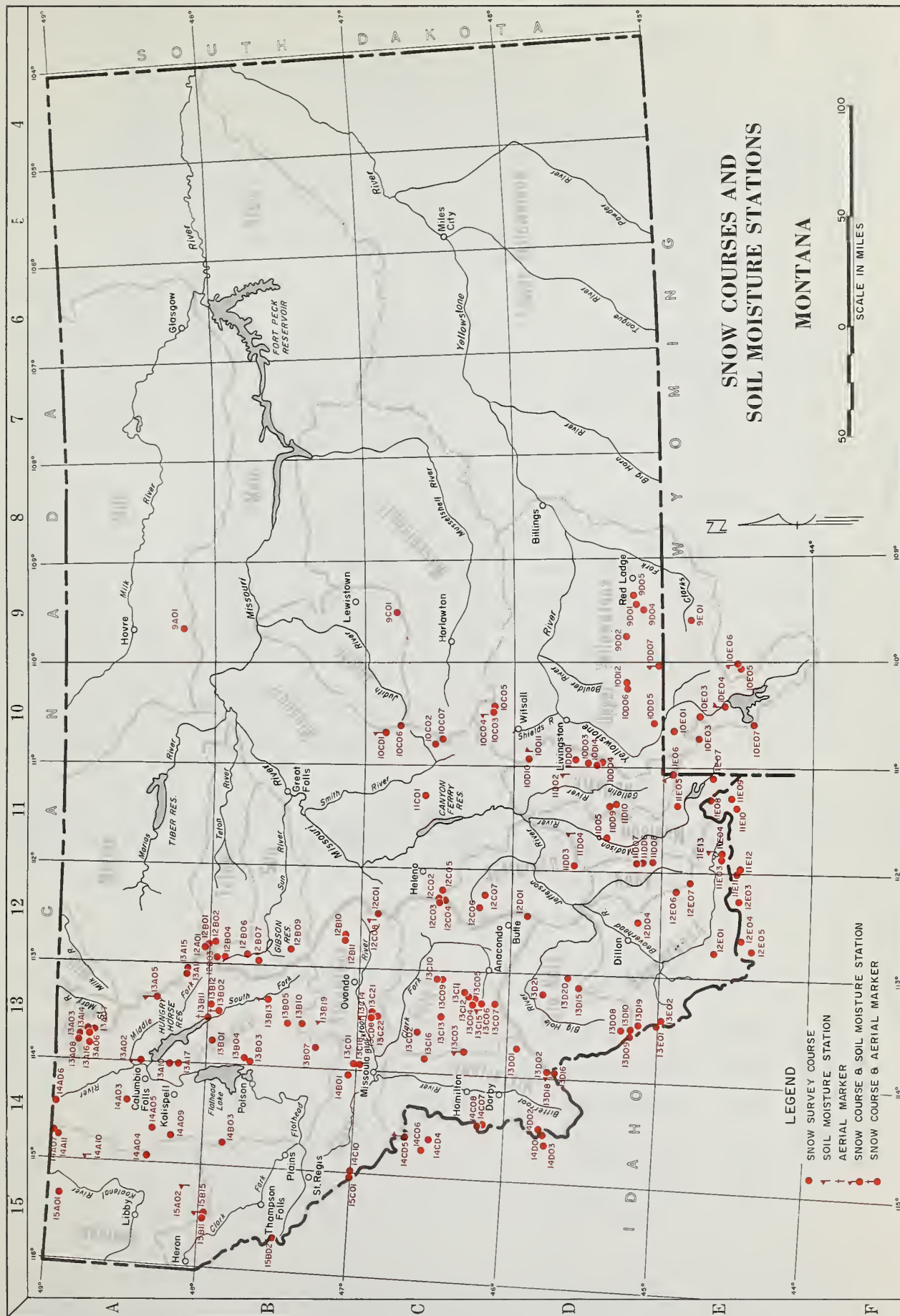
* * * * *

*
* The water supply outlook is good, with above
* average snow cover in all mountain watersheds.
* Low elevation snow is generally near average,
* while higher in the mountains the water meas-
* ured at the snow courses is near the February
* 1 average.
*
* Mountain soil moisture varies from above aver-
* age in the lower elevations to below average
* in the higher elevations.
*
* Reservoir storage is generally near to above
* average.
*
* * * * *

West of the Continental Divide there is a good potential for above average spring and summer runoff. The mountain snow cover is about double that measured a year ago, and about 40 percent above the 1948-62, 15 year average. Mountain soil moisture is generally near or slightly below average in the higher elevations and above average in the lower elevations.

East of the Continental Divide, headwaters of the Missouri and Yellowstone Rivers have a snow pack 50 to 75 percent greater than the 15 year average. This accumulation is 2 to $2\frac{1}{2}$ times more than on January 1 last year. The water measured at snow courses along the Continental Divide on headwater streams tributary to the Main Stem of the Missouri River is slightly above average and greater than that measured a year ago.

Moisture stored in the soil under the snow pack is generally above or near average in the lower elevations as the result of some low elevation snowmelt. In the higher elevations of the Missouri and Yellowstone headwaters, soil moisture varies from near average to slightly below average. In the headwaters of streams tributary to the Missouri River, mountain soil moisture is generally below average.



1965 INDEX to MONTANA SNOW COURSES and SOIL MOISTURE STATIONS

SNOW COURSES

Drainage Basin & Course Name	Number	Elev.	Sec.	Typ.	Range	Record Begin	Measuring Dates 1/2	Mean, By 2/
COLUMBIA RIVER BASIN								
KOOTENAI RIVER								
Bearse Trail	15819M	3800	5	25N	30W	1964	Monthly	2
Murphy Lake R. S.	14410M	3000	5	34N	25W	1964	Monthly	2
Brush Creek	13602M	3050	2	26N	25W	1964	Monthly	2
Graves Creek	14411	4200	1	38N	25W	1965	Monthly	1
Graves Creek	14412	4200	1	38N	25W	1965	Monthly	1
Heasel Divide	14467	5450	20	37N	24W	1937	3,4,4,5,5,6	1,2
FLATHEAD RIVER								
Oasert Mountain	13462M	4600	24	31N	19W	1956	Monthly	1
Marion Pass	13465M	4250	34	30N	14W	1950	Monthly	1
CLARK FORK RIVER								
Copeland Lake	13019M	6450	6	5N	12W	1962	Monthly	1
Laurel Lake	13020M	4100	11	13N	15W	1961	Monthly	1
Swaley Lake	13819M	4030	21	17N	15W	1964	Monthly	2
Shelabo Summit	13003M	7260	30	6N	17W	1964	Monthly	1
BITTERROOT RIVER								
Gibbons Pass	13018M	7100	4	2S	19W	1962	Monthly	1
Lolo Pass	14009M	5250	11	10N	22W	1963	Monthly	1
MISSOURI RIVER BASIN								
BEAVERHEAD RIVER								
Lakeview	11013M	6700	23	14S	2W	1962	Monthly	10
MADISON RIVER								
Red Bluff	11004M	4800	7	3S	1E	1961	Monthly	7
GALLATIN RIVER								
College Site	11008M	4856	18	2S	5E	1956	Monthly	1
Twenty-One Mile	11006M	7150	1	11S	5E	1963	Monthly	6
MISSOURI RIVER MAIN STEM								
Steeple Pass	12008M	6500	16	13N	7W	1963	Monthly	1
Range Hill	10003M	7420	34	13N	8E	1963	Monthly	1
YELLOWSTONE RIVER								
Battle Ridge	10013M	6020	32	2N	7E	1960	Monthly	1
Northeast Entrance	10007M	7350	33	9S	14E	1962	Monthly	6
Shields River	10004M	5850	4	4N	10E	1960	Monthly	1
MISSOURI RIVER BASIN (continued)								
RUBY RIVER								
Clower Meadow	11008	8600	28	9S	2W	1963	3,4,5	1
Olvide	12807	7900	14	12S	4W	1963	3,4,5	1
Notch	12806	8500	18	11S	4W	1963	3,4,5	1
BIG HOLE RIVER								
Abundance Lake	13020	8500	7	3S	11W	1963	3,4,5	1
Pinebush Lake	13019	8600	4	8S	16W	1963	3,4,5	1
Jehake Creek	13021	8500	11	13S	13W	1963	3,4,5	1
13008	7340	25	7S	16W	1948	3,4,5	1	
JEFFERSON RIVER								
Berry Meadow	12007	7300	8	4W	5W	1962	3,4,5	1
Plum Creek	12006	6500	10	3W	6W	1962	3,4,5	1
Pipestone Pass	12001	7200	10	18W	7W	1938	1,2,3,4,5	1
MADISON RIVER								
Cell Road	11007	8050	21	8S	2W	1962	3,4,5	1
Whegan Lake	11005	6500	22	11S	3E	1934	3,4,5	1
Jack Creek	11006	6500	22	11S	3E	1934	3,4,5	1
North Meadow	11005	6500	23	6S	1E	1961	3,4	1
West Yellowstone	11007	6700	34	11S	5E	1934	1,2,3,4,5	3
GALLATIN RIVER								
Jack Falls	10004	7350	3	4S	4E	1963	2,3,4,5,5,6	1
Beaver Basin	11009	8150	14	5S	4E	1963	3,4,5	1
Owll's Glide	10004	8100	14	4S	4E	1935	2,3,4,5,5,6	1
Nood Meadow	10003	6600	22	4S	6E	1935	2,3,4,5,5,6	1
Little Park	11010	6700	22	5S	3E	1935	2,3,4,5	1
Twenty-One Mile	11006	7150	1	11S	5E	1934	1,2,3,4,5	3
MISSOURI RIVER MAIN STEM								
Boulder Reservoir	11001	7950	1	9N	3E	1963	3,4,5	1
Chesman Reservoir	12005	6200	10	8N	5W	1936	1,2,3,4,5	3
Grass Creek	10007	7900	1	8N	8E	1963	3,4,5	1
Grass Creek	10007	7900	1	8N	8E	1963	3,4,5	1
King Hill	10001	7500	34	13N	8E	1934	3,4,5	1
Rocky Boy	9A01	5200	15	28N	16E	1941	3,4	7
Steeple Pass	12001	6600	16	13N	7W	1934	3,4,5	3
Tem Mile Middle	12002	6800	12	8N	6W	1935	1,2,3,4,5	3
Tem Mile Middle	12003	6800	12	8N	6W	1935	1,2,3,4,5	3
Tem Mile Upper	12004	8000	19	8N	5W	1935	1,2,3,4,5	3
SUN-TETON-MARIAS RIVERS								
Badger Pass	13A15	6600	4	27N	11W	1964	3,4,5	1
Gahin Creek	12805	7200	23	13N	10W	1968	3,4,5	1
Freight Creek	12A01	6000	13	46N	10W	1948	3,4,5	1
Goat Mountain	12807	7000	20	22N	10W	1934	3,4,5	3
Walton Creek	12802	5300	16	25N	9W	1948	3,4,5	1
West Fork	12804	5700	32	25N	10W	1949	3,4,5	1
Wrong Ridge	12803	6800	17	25N	10W	1949	3,4,5	1
JUDITH RIVER								
Crystals Lake	9C01	6100	19	12N	18E	1941	3,4	1
Spur Fork	10C06	8000	20	12N	9E	1963	3,4,5	1
UPPER YELLOWSTONE RIVER								
Bald Ridge	10C05	7500	11	4N	10E	1961	3,4,5	1
Casp Spring	9C01	7950	22	9S	9E	1935	3,4	2
Grevice Mountain	10C05	8400	22	9S	9E	1935	3,4	2
Gristly Peak	10C05	8400	22	7S	12E	1961	1,2,3,4,5	1
Monument Peak	10C02	9000	22	7S	12E	1961	3,4,5	1
Northeast Entrance	10C07	7400	33	9S	14E	1937	1,2,3,4,5	6
Fortunette R. S.	10C03	6500	14	10E	1938	3,4	1	
Scaladene Creek	9C04	8800	10	8S	18E	1960	3,4,5	4
West Ridge	9B02	7500	9	7S	14E	1940	3,4,5	1
MISSOURI RIVER BASIN								
BEAVERHEAD RIVER								
Bloddy Old	13D10	7600	12	8S	16W	1948	3,4,5	1
Center Creek	12C04	7400	22	8S	7W	1963	3,4,5	1
Elkhorn Springs	13D15	7800	21	4S	22W	1935	3,4,5	1
Lakeview Canyon	11C04	6930	26	14S	2W	1948	3,4,5	10
Lakeview Ridge	11C03	7400	27	14S	2W	1948	3,4,5	1
Lash Peak	13D11	7480	9	10S	15W	1948	3,4	1
Little Pine Ridge	12C03	8800	18	14S	15W	1948	3,4,5	1
12C03	8800	18	14S	15W	1948	3,4,5	1	
ST. MARY RIVER BASIN								
Tobacco Lake No. 2	13A02	5600	1	38N	17W	1922	\$	3,9
Young Allen No. 7	13A03	4900	22	35N	16W	1955	\$	3,9
Young Allen No. 7	13A07	5700	27	35N	16W	1922	\$	3,9
Plagen Pass No. 6	13A04	5800	36	36N	17W	1937	\$	3,9
BITTERROOT RIVER								
Address	13C16	4680	28	9N	15W	1960	3,4,5	1
Grass Fork R. S.	13D02	7100	10	2S	19W	1937	1,2,3,4,5,5,6	1,3
Glenn Horse	14C07	5940	5	4N	23W	1960	3,4,5	1
Mos Perce Camp	14D02	5680	19	1S	23W	1937	3,4,5	1
Mos Perce Pass	14D01	6570	15	1S	22W	1937	3,4,5	1
Twin Lakes	14C06	6510	32	5N	23W	1966	3,4,5	1
CLARK FORK RIVER,								
Black Pine	13C13	7100	26	8N	15W	1949	3,4,5	1,2
Copper Creek	12B16	5760	1	15N	9W	1962	3,4,5	1,2
Coyote Hill	13B10	4200	22	18N	16W	1947	3,4,5	1,2
Fred Burr Pass	13C11	8000	12	6N	12W	1957	3,4,5	1,2
Gold Creek	13C10	7200	14	8N	12W	1949	3,4,5	1,2
Heart Lake Trail	14C10	4800	11	14N	27W	1965	3,4,5	1
Indigo Creek	13C02	6450	16	5N	13W	1936	1,2,3,4,5	1,2
Laurel Forest No. 3	13C21	5450	19	13N	14W	1951	1,2,3,4,5	8
Laurel Forest No. 4	13C22	4650	21	13N	15W	1951	1,2,3,4,5	8
Laurel Forest No. 6	13C23	4500	23	13N	15W	1951	1,2,3,4,5	8
Shelabo Summit	13C03	7260	30	6N	17W	1937	3,4,5,5,6	1
Slide Rock Mountain	13C02	7160	35	16N	16W	1937	3,4,5,5,6	1
Southern Cross	13C05	6900	8	5N	13W	1936	2,3,4	4
Spring Gulch	13C04	7780	14	14N	12W	1936	1,2,3,4,5	1
Stuart Mill	13C06	6560	19	5N	13W	1936	2,3,4	4
Stuart Mountain	13C01	7400	6	14N	15W	1936	1,2,3,4,5,5,6	8
TV Mountain	14B01	6800	33	15N	15W	1956	1,2,3,4,5	1
BITTERROOT RIVER								
Address	13C16	4680	28	9N	15W	1960	3,4,5	1
Grass Fork R. S.	13D02	7100	10	2S	19W	1937	1,2,3,4,5,5,6	1,3
Glenn Horse	14C07	5940	5	4N	23W	1960	3,4,5	1
Mos Perce Camp	14D02	5680	19	1S	23W	1937	3,4,5	1
Mos Perce Pass	14D01	6570	15	1S	22W	1937	3,4,5	1
Twin Lakes	14C06	6510	32	5N	23W	1966	3,4,5	1
ST. MARY RIVER BASIN								
Tobacco Lake No. 2	13A02	5600	1	38N	17W	1922	\$	3,9
Young Allen No. 7	13A03	4900	22	35N	16W	1955	\$	3,9
Young Allen No. 7	13A07	5700	27	35N	16W	1922	\$	3,9
Plagen Pass No. 6	13A04	5800	36	36N	17W	1937	\$	3,9
MISSOURI RIVER BASIN								
BEAVERHEAD RIVER								
Bloddy Old	13D10	7600	12	8S	16W	1948	3,4,5	1
Center Creek	12C04	7400	22	8S	7W	1963	3,4,5	1
Elkhorn Springs	13D15	7800	21	4S	22W	1935	3,4,5	1
Lakeview Canyon	11C04	6930	26	14S	2W	1948	3,4,5	10
Lakeview Ridge	11C03	7400	27	14S	2W	1948	3,4,5	1
Lash Peak	13D11	7480	9	10S	15W	1948	3,4	1
Little Pine Ridge	12C03	8800	18	14S	15W	1948	3,4,5	1
12C03	8800	18	14S	15W	1948	3,4,5	1	

SNOW SURVEY DATA

AS OF DECEMBER 1, 1964

(inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	
						LAST YEAR	AVERAGE

COLUMBIA RIVER BASIN

CLARK FORK RIVER

13C21	Lubrecht Forest No. 3	5450	11/28	3	0.3	-	-
13C22	Lubrecht Forest No. 4	4650	11/28	2	0.2	-	-
13C08	Lubrecht Forest No. 6	4040	11/28	2	0.2	0.0	-
13C18	Spring Gulch	6000	11/29	9	1.1	0.0	-
13C01	Stuart Mountain	7400	11/29	21	3.2	4.5	-
14B01	TV Mountain	6800	11/28	13	1.4	2.3	-

1940 Census of the United States

State	County	City	Block	Household	Population
Alabama	Jefferson	Mobile	100	1	1

State	County	City	Block	Household	Population
Alabama	Jefferson	Mobile	100	1	1
Alabama	Jefferson	Mobile	100	2	2
Alabama	Jefferson	Mobile	100	3	3
Alabama	Jefferson	Mobile	100	4	4
Alabama	Jefferson	Mobile	100	5	5
Alabama	Jefferson	Mobile	100	6	6
Alabama	Jefferson	Mobile	100	7	7
Alabama	Jefferson	Mobile	100	8	8
Alabama	Jefferson	Mobile	100	9	9
Alabama	Jefferson	Mobile	100	10	10
Alabama	Jefferson	Mobile	100	11	11
Alabama	Jefferson	Mobile	100	12	12
Alabama	Jefferson	Mobile	100	13	13
Alabama	Jefferson	Mobile	100	14	14
Alabama	Jefferson	Mobile	100	15	15
Alabama	Jefferson	Mobile	100	16	16
Alabama	Jefferson	Mobile	100	17	17
Alabama	Jefferson	Mobile	100	18	18
Alabama	Jefferson	Mobile	100	19	19
Alabama	Jefferson	Mobile	100	20	20
Alabama	Jefferson	Mobile	100	21	21
Alabama	Jefferson	Mobile	100	22	22
Alabama	Jefferson	Mobile	100	23	23
Alabama	Jefferson	Mobile	100	24	24
Alabama	Jefferson	Mobile	100	25	25
Alabama	Jefferson	Mobile	100	26	26
Alabama	Jefferson	Mobile	100	27	27
Alabama	Jefferson	Mobile	100	28	28
Alabama	Jefferson	Mobile	100	29	29
Alabama	Jefferson	Mobile	100	30	30
Alabama	Jefferson	Mobile	100	31	31
Alabama	Jefferson	Mobile	100	32	32
Alabama	Jefferson	Mobile	100	33	33
Alabama	Jefferson	Mobile	100	34	34
Alabama	Jefferson	Mobile	100	35	35
Alabama	Jefferson	Mobile	100	36	36
Alabama	Jefferson	Mobile	100	37	37
Alabama	Jefferson	Mobile	100	38	38
Alabama	Jefferson	Mobile	100	39	39
Alabama	Jefferson	Mobile	100	40	40
Alabama	Jefferson	Mobile	100	41	41
Alabama	Jefferson	Mobile	100	42	42
Alabama	Jefferson	Mobile	100	43	43
Alabama	Jefferson	Mobile	100	44	44
Alabama	Jefferson	Mobile	100	45	45
Alabama	Jefferson	Mobile	100	46	46
Alabama	Jefferson	Mobile	100	47	47
Alabama	Jefferson	Mobile	100	48	48
Alabama	Jefferson	Mobile	100	49	49
Alabama	Jefferson	Mobile	100	50	50
Alabama	Jefferson	Mobile	100	51	51
Alabama	Jefferson	Mobile	100	52	52
Alabama	Jefferson	Mobile	100	53	53
Alabama	Jefferson	Mobile	100	54	54
Alabama	Jefferson	Mobile	100	55	55
Alabama	Jefferson	Mobile	100	56	56
Alabama	Jefferson	Mobile	100	57	57
Alabama	Jefferson	Mobile	100	58	58
Alabama	Jefferson	Mobile	100	59	59
Alabama	Jefferson	Mobile	100	60	60
Alabama	Jefferson	Mobile	100	61	61
Alabama	Jefferson	Mobile	100	62	62
Alabama	Jefferson	Mobile	100	63	63
Alabama	Jefferson	Mobile	100	64	64
Alabama	Jefferson	Mobile	100	65	65
Alabama	Jefferson	Mobile	100	66	66
Alabama	Jefferson	Mobile	100	67	67
Alabama	Jefferson	Mobile	100	68	68
Alabama	Jefferson	Mobile	100	69	69
Alabama	Jefferson	Mobile	100	70	70
Alabama	Jefferson	Mobile	100	71	71
Alabama	Jefferson	Mobile	100	72	72
Alabama	Jefferson	Mobile	100	73	73
Alabama	Jefferson	Mobile	100	74	74
Alabama	Jefferson	Mobile	100	75	75
Alabama	Jefferson	Mobile	100	76	76
Alabama	Jefferson	Mobile	100	77	77
Alabama	Jefferson	Mobile	100	78	78
Alabama	Jefferson	Mobile	100	79	79
Alabama	Jefferson	Mobile	100	80	80
Alabama	Jefferson	Mobile	100	81	81
Alabama	Jefferson	Mobile	100	82	82
Alabama	Jefferson	Mobile	100	83	83
Alabama	Jefferson	Mobile	100	84	84
Alabama	Jefferson	Mobile	100	85	85
Alabama	Jefferson	Mobile	100	86	86
Alabama	Jefferson	Mobile	100	87	87
Alabama	Jefferson	Mobile	100	88	88
Alabama	Jefferson	Mobile	100	89	89
Alabama	Jefferson	Mobile	100	90	90
Alabama	Jefferson	Mobile	100	91	91
Alabama	Jefferson	Mobile	100	92	92
Alabama	Jefferson	Mobile	100	93	93
Alabama	Jefferson	Mobile	100	94	94
Alabama	Jefferson	Mobile	100	95	95
Alabama	Jefferson	Mobile	100	96	96
Alabama	Jefferson	Mobile	100	97	97
Alabama	Jefferson	Mobile	100	98	98
Alabama	Jefferson	Mobile	100	99	99
Alabama	Jefferson	Mobile	100	100	100

SNOW SURVEY DATA

AS OF JANUARY 1, 1965

SNOW COURSE			CURRENT DATA			PAST RECORD	
			DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE

(Inches)

COLUMBIA RIVER BASIN

FLATHEAD RIVER

13A02	Desert Mountain	5600	1/4	44	10.3	5.2	6.6*
14A03	Hell Roaring Divide	5770	12/31	78	22.3	10.6	-
13B13	Holbrook	4530				-	3.3*
13A05	Marias Pass	5250	12/31	49	10.8*	5.2	8.0
13B02	Spotted Bear Mountain	7000				4.0	7.6*
13B11	Twin Creeks	3580				2.8	5.8*

CLARK FORK RIVER

13B10	Coyote Hill	4200	12/30	27	6.1	2.3	5.0*
15B02	Lookout	5250	12/30	69	17.6	12.8	17.6*
13C21	Lubrecht Forest No. 3	5450	12/29	18	3.0	2.6	3.3*
13C22	Lubrecht Forest No. 4	4650	12/29	12	1.8	1.7	1.8*
13C08	Lubrecht Forest No. 6	4040	12/29	14	2.4	1.8	1.9*
13C18	Spring Gulch	6000	1/3	33	8.2	3.8	4.8*
13C07	Storm Lake	7780	12/30	34	8.4	3.8	6.1*
13C01	Stuart Mountain	7400	1/5	67	20.1	11.0	11.6*
14B01	TV Mountain	6800	12/31	44	10.7	5.0	7.2*

BITTERROOT RIVER

13D02	Gibbons Pass	7100	1/4	56	16.4	8.1	10.8*
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6	1	1916	\$5.00
7	1	1917	\$5.00
8	1	1918	\$5.00
9	1	1919	\$5.00
10	1	1920	\$5.00
11	1	1921	\$5.00
12	1	1922	\$5.00
13	1	1923	\$5.00
14	1	1924	\$5.00
15	1	1925	\$5.00
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17	1	1927	\$5.00
18	1	1928	\$5.00
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64	1	1974	\$5.00
65	1	1975	\$5.00
66	1	1976	\$5.00
67	1	1977	\$5.00
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69	1	1979	\$5.00
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72	1	1982	\$5.00
73	1	1983	\$5.00
74	1	1984	\$5.00
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114	1	2024	\$5.00
115	1	2025	\$5.00
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117	1	2027	\$5.00
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SNOW SURVEY DATA

AS OF JANUARY 1, 1965

SNOW COURSE			CURRENT DATA			PAST RECORD (Inches)	
			DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE

MISSOURI RIVER BASIN

BEAVERHEAD RIVER

12E03	Camp Creek	6800	12/28	32	6.5	2.8	3.7
11E12	Kilgore	6200	12/28	29	5.9	2.4	4.3*

JEFFERSON RIVER

12D01	Pipestone Pass	7200	12/29	13	2.0	1.6	2.4*
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MADISON RIVER

11E09	Big Springs	6500	12/31	58	13.3	5.8	7.9
11E05	Hebgen Dam	6550	12/30	34	7.3	4.2	5.4
11E10	Island Park	6315	12/30	55	11.5	4.5	6.1
10E02	Norris Basin	7500	12/28	32	7.2	3.8	4.3*
11E08	Valley View	6500	12/30	45	11.2	4.6	5.5
11E07	West Yellowstone	6700	12/31	36	8.0	3.4	4.9

GALLATIN RIVER

11E06	Twenty-One Mile	7150	12/31	57	13.8	5.7	8.0
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MISSOURI MAIN STEM

12C05	Chessman Reservoir	6200	12/31	7	1.4	1.5	2.1
12C02	Ten Mile Lower	6250	12/30	14	3.0	2.3	3.4
12C03	Ten Mile Middle	6800	12/29	23	5.3	3.6	5.1
12C04	Ten Mile Upper	8000	12/29	31	7.5	5.1	6.3

UPPER YELLOWSTONE

10E03	Canyon	7750	12/29	48	12.6	3.6	6.0
10E06	East Entrance	7000	12/29	28	6.3	2.9	4.4*
9D05	Grizzly Peak	8400	12/31	28	6.8	2.4	-
10E04	Lake Camp	7850	12/30	31	5.7	2.1	4.0*
10E01	Lupine Creek	7300	12/28	31	7.0	2.9	4.4*
10D07	Northeast Entrance	7400	12/29	24	5.6	2.8	3.9
10E05	Sylvan Pass	7100	12/29	36	10.1	4.3	5.6*
10E07	Thumb Divide	7900	12/30	67	18.1	5.6	8.9*

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SOIL MOISTURE DATA

AS OF JULY 1, 1964

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE

COLUMBIA RIVER BASIN

Flathead

13A02M	Desert Mountain	5600	54	8.4	-	-	8.6	8.2
13A05M	Marias Pass	5250	54	6.5	6/28	5.0	6.0	5.2

Clark Fork

13C15M	Georgetown Lake	6450	48	8.3	6/30	7.4	7.4	-
13B19M	Seeley Lake	4030	48	10.6	-	-	-	-

Bitterroot

13D18M	Gibbons Pass	7100	48	7.1	6/30	6.5	6.8	-
14C05M	Lolo Pass	5250	48	8.5	6/29	10.3	8.6	-

MISSOURI RIVER BASIN

Beaverhead

11E13M	Lakeview	6700	48	15.3	6/30	14.8	14.8	-
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Madison

10D04M	Red Bluff	4800	40	4.7	7/9	1.2	-	-
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Gallatin

11D02M	College Site	4856	54	14.5	7/2	11.0	11.6	9.5
11E06M	Twenty-One Mile	7150	48	8.8	7/2	7.6	8.1	-

Missouri Main Stem

10C01M	Kings Hill	7420	48	11.8	6/26	10.9	10.8	-
12C08M	Stemple Pass	6350	48	5.9	6/27	5.0	5.4	-

Yellowstone

10D11M	Battle Ridge	6020	48	15.4	7/1	14.4	17.7	-
10D07M	Northeast Entrance	7350	48	9.4	7/1	8.8	8.9	-

SOIL MOISTURE DATA

AS OF AUGUST 1, 1964

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE

COLUMBIA RIVER BASIN

Flathead

13A02M	Desert Mountain	5600	54	8.4	8/7	6.3	7.0	6.4
13A05M	Marias Pass	5250	54	6.5	8/2	3.4	4.4	3.9

Clark Fork

13C15M	Georgetown Lake	6450	48	8.3	7/30	4.2	6.3	-
13B19M	Seeley Lake	4030	48	10.6	-	-	6.1	-

Bitterroot

13D18M	Gibbons Pass	7100	48	7.1	7/30	5.4	5.8	-
14C05M	Lolo Pass	5250	48	8.5	7/30	6.4	6.9	-

MISSOURI RIVER BASIN

Beaverhead

11E13M	Lakeview	6700	48	15.3	7/31	9.2	8.2	-
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Madison

10D04M	Red Bluff	4800	40	4.7	8/7	1.1	-	-
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Gallatin

11D02M	College Site	4856	54	14.5	7/31	8.4	8.4	7.4
11E06M	Twenty-One Mile	7150	48	8.8	7/27	4.4	4.5	-

Missouri Main Stem

10C01M	Kings Hill	7420	48	11.8	7/30	9.1	9.6	-
12C08M	Stemple Pass	6350	48	5.9	8/1	5.2	4.6	-

Yellowstone

10D11M	Battle Ridge	6020	48	15.4	8/3	12.0	12.3	-
10D07M	Northeast Entrance	7350	48	9.4	8/8	5.3	6.4	-

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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1980-1981

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1980-1981

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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SOIL MOISTURE DATA

AS OF SEPTEMBER 1, 1964

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE

COLUMBIA RIVER BASIN

Kootenai

15B15M	Baree Trail	3800	48		9/9	5.2	-	-
14A10M	Murphy Lake R.S.	3000	48		9/2	17.5	-	-

Flathead

13A02M	Desert Mountain	5600	54	8.4	9/8	5.7	4.6	4.6
13A05M	Marias Pass	5250	54	6.5	8/31	3.6	2.8	3.6

Clark Fork

13C15M	Georgetown Lake	6450	48	8.3	8/27	2.7	2.6	-
13B19M	Seeley Lake	4030	48	10.6	-	-	3.8	-

Bitterroot

13D18M	Gibbons Pass	7100	48	7.1	8/28	5.1	4.9	-
14C05M	Lolo Pass	5250	48	8.5	8/28	6.1	4.3	-

MISSOURI RIVER BASIN

Beaverhead

11E13M	Lakeview	6700	48	15.3	9/1	7.8	6.3	-
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Madison

10D04M	Red Bluff	4800	40	4.7	9/1	1.6	-	-
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Gallatin

11D02M	College Site	4856	54	14.5	8/28	8.5	7.4	6.6
11E06M	Twenty-One Mile	7150	48	8.8	8/29	2.5	2.3	-

Missouri Main Stem

10C01M	Kings Hill	7420	48	11.8	8/28	8.6	8.7	-
12C08M	Stemple Pass	6350	48	5.9	8/31	5.3	5.1	-

Yellowstone

10D11M	Battle Ridge	6020	48	15.4	9/1	10.9	8.0	-
10D07M	Northeast Entrance	7350	48	9.4	9/1	5.2	5.0	-

SOIL MOISTURE DATA

DATE: _____

NO. _____	DATE _____	TIME _____	LOCATION _____
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MOISTURE DATA

DEPTH (cm)	MOISTURE (%)	TEMPERATURE (°C)	WIND (km/h)	REL. HUM. (%)
0-5	15	25	10	85
5-10	12	22	12	82
10-15	10	20	15	80
15-20	8	18	18	78
20-25	5	15	20	75
25-30	3	12	22	72
30-35	2	10	25	70
35-40	1	8	28	68
40-45	0	5	30	65
45-50	0	3	32	62

WIND DATA

TIME	DIRECTION	SPEED (km/h)	FORCE
0800	SE	10	1
1000	SE	12	1
1200	SE	15	2
1400	SE	18	2
1600	SE	20	2
1800	SE	22	2
2000	SE	25	2
2200	SE	28	2
2400	SE	30	2

SOIL MOISTURE DATA

AS OF OCTOBER 1, 1964

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE

COLUMBIA RIVER BASIN

Kootenai

15B15M	Baree Trail	3800	48		9/30	5.5	-	-
14A10M	Murphy Lake R.S.	3000	48		10/1	17.2	-	-

Flathead

13A02M	Desert Mountain	5600	54	8.4	10/2	7.9	4.7	5.3
13A05M	Marias Pass	5250	54	6.5	10/10	4.4	2.9	3.7

Clark Fork

13C15M	Georgetown Lake	6450	48	8.3	9/28	2.8	2.6	-
13B19M	Seeley Lake	4030	48	10.6	10/2	5.4	-	-

Bitterroot

13D18M	Gibbons Pass	7100	48	7.1	10/1	5.4	5.6	-
14C05M	Lolo Pass	5250	48	8.5	10/2	8.4	4.3	-

MISSOURI RIVER BASIN

Beaverhead

11E13M	Lakeview	6700	48	15.3	10/1	5.4	7.6	-
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Madison

10D04M	Red Bluff	4800	40	4.7	10/2	1.2	-	-
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Gallatin

11D02M	College Site	4856	54	14.5	10/2	8.9	6.3	6.5
11E06M	Twenty-One Mile	7150	48	8.8	9/29	1.7	4.6	-

Missouri Main Stem

10C01M	Kings Hill	7420	48	11.8	9/29	8.3	7.8	-
12C08M	Stemple Pass	6350	48	5.9	9/29	4.5	4.5	-

Yellowstone

10D11M	Battle Ridge	6020	48	15.4	10/2	10.3	8.2	-
10D07M	Northeast Entrance	7350	48	9.4	9/30	4.6	8.4	-

SOIL TEMPERATURE DATA

at the station

Station No. _____ Date _____

Soil Temperature

Date	Time	Soil Temp.		Remarks
		Depth	Temp.	
		1 ft.		
		2 ft.		
		3 ft.		
		4 ft.		
		5 ft.		
		6 ft.		
		7 ft.		
		8 ft.		
		9 ft.		
		10 ft.		

Atmospheric Temperature

Date	Time	Atmospheric Temp.		Remarks
		Height	Temp.	
		1 ft.		
		2 ft.		
		3 ft.		
		4 ft.		
		5 ft.		
		6 ft.		
		7 ft.		
		8 ft.		
		9 ft.		
		10 ft.		

SOIL MOISTURE DATA

AS OF NOVEMBER 1, 1964

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	** AVERAGE

COLUMBIA RIVER BASIN

Kootenai

15B15M	Baree Trail	3800	48		11/2	6.1	-	-
14A10M	Murphy Lake R.S.	3000	48		11/12	18.3	-	-

Flathead

13A02M	Desert Mountain	5600	54	8.4	10/30	6.5	5.1	5.7
13A05M	Marias Pass	5250	54	6.5	11/7	4.8	3.2	4.5

Clark Fork

13C15M	Georgetown Lake	6450	48	8.3	10/30	2.5	2.6	-
13B19M	Seeley Lake	4030	48	10.6	-	-	1.2	-

Bitterroot

13D18M	Gibbons Pass	7100	48	7.1	10/28	5.3	5.8	-
14C05M	Lolo Pass	5250	48	8.5	11/1	7.1	4.2	-

MISSOURI RIVER BASIN

Beaverhead

11E13M	Lakeview	6700	48	15.3	11/9	6.4	5.9	-
--------	----------	------	----	------	------	-----	-----	---

Madison

10D04M	Red Bluff	4800	40	4.7	11/2	1.5	-	-
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Gallatin

11D02M	College Site	4856	54	14.5	10/30	8.0	6.4	7.3
11E06M	Twenty-One Mile	7150	48	8.8	-	-	3.9	-

Missouri Main Stem

10C01M	Kings Hill	7420	48	11.8	10/30	8.3	7.9	-
12C08M	Stemple Pass	6350	48	5.9	11/2	4.3	3.8	-

Yellowstone

10D11M	Battle Ridge	6020	48	15.4	11/5	11.7	8.1	-
10D07M	Northeast Entrance	7350	48	9.4	10/31	5.3	8.0	-

SOIL MOISTURE DATA

AS OF DECEMBER 1, 1964

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE

COLUMBIA RIVER BASIN

Kootenai

15B15M	Baree Trail	3800	48		12/3	6.7	-	-
14A10M	Murphy Lake R.S.	3000	48		12/1	18.4	-	-
15A02M	Raven R.S.	3050	48		12/4	20.0	-	-

Flathead

13A02M	Desert Mountain	5600	54	8.4	-	-	-	-
13A05M	Marias Pass	5250	54	6.5	12/3	5.3	4.0	4.7

Clark Fork

13C15M	Georgetown Lake	6450	48	8.3	12/1	2.9	2.6	-
13B19M	Seeley Lake	4030	48	10.6	11/30	4.6	1.2	-
13C03M	Skalkaho Summit	7260	48		-	-	-	-

Bitterroot

13D18M	Gibbons Pass	7100	48	7.1	11/30	4.7	5.6	-
14C05M	Lolo Pass	5250	48	8.5	11/27	7.1	4.9	-

MISSOURI RIVER BASIN

Beaverhead

11E13M	Lakeview	6700	48	15.3	12/2	5.6	8.9	-
--------	----------	------	----	------	------	-----	-----	---

Madison

10D04M	Red Bluff	4800	40	4.7	-	-	-	-
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Gallatin

11D02M	College Site	4856	54	14.5	12/4	9.5	6.5	8.6
11E06M	Twenty-One Mile	7150	48	8.8	11/28	1.3	4.0	-

Missouri Main Stem

10C01M	Kings Hill	7420	48	11.8	11/30	7.8	7.8	-
12C08M	Stemple Pass	6350	48	5.9	11/30	4.0	4.1	-

Yellowstone

10D11M	Battle Ridge	6020	48	15.4	12/1	12.7	9.2	-
10D07M	Northeast Entrance	7350	48	9.4	12/3	6.0	8.0	-

SOIL MOISTURE DATA

AS OF JANUARY 1, 1965

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE

COLUMBIA RIVER BASIN

Kootenai

15B15M	Baree Trail	3800	48				-	-
14A10M	Murphy Lake R.S.	3000	48		1/4	19.1	-	-
15A02M	Raven R.S.	3050	48					

Flathead

13A02M	Desert Mountain	5600	54	8.4			5.6	6.6
13A05M	Marias Pass	5250	54	6.5	1/1	5.4	4.1	4.8

Clark Fork

13C15M	Georgetown Lake	6450	48	8.3	12/30	3.0	2.6	-
13B19M	Seeley Lake	4030	48	10.6	12/30	8.2	1.4	-
13C03M	Skalkaho Summit	7260	48			-	-	-

Bitterroot

13D18M	Gibbons Pass	7100	48	7.1	1/4	5.2	5.6	-
14C05M	Lolo Pass	5250	48	8.5	12/29	8.5	4.9	-

MISSOURI RIVER BASIN

Beaverhead

11E13M	Lakeview	6700	48	15.3			8.6	-
--------	----------	------	----	------	--	--	-----	---

Madison

10D04M	Red Bluff	4800	40	4.7	1/4	2.2	1.7	-
--------	-----------	------	----	-----	-----	-----	-----	---

Gallatin

11D02M	College Site	4856	54	14.5	12/31	9.8	6.6	8.6
11E06M	Twenty-One Mile	7150	48	8.8	12/28	1.3	4.0	-

Missouri Main Stem

10C01M	Kings Hill	7420	48	11.8	12/30	7.9	7.8	-
12C08M	Stemple Pass	6350	48	5.9	12/29	4.2	4.0	-

Yellowstone

10D11M	Battle Ridge	6020	48	15.4	12/31	14.8	9.2	-
10D07M	Northeast Entrance	7350	48	9.4	12/30	5.8	7.9	-

RESERVOIR STORAGE DATA

AS OF DECEMBER 31, 1964

(1000 Acre Feet)

1955-1956-1957

			USEABLE STORAGE		
BASIN	RESERVOIR	USEABLE CAPACITY	THIS YEAR	LAST YEAR	AVERAGE
<u>COLUMBIA RIVER BASIN</u>					
Flathead	Hungry Horse	3,428.0	3,222.0	2,955.0	2,954.5**
	Flathead Lake	1,791.0	1,406.0	1,532.0	1,297.0
	Camas <u>1/</u>	45.2	17.0	16.9	30.7
	Mission Valley <u>2/</u>	100.3	35.2	15.8	29.4
Clark Fork	Georgetown Lake	31.0	29.6	28.4	25.9
	Noxon Rapids	334.6	-	326.7	-
Bitterroot	Como	34.9	-	3.4	8.8
	Painted Rocks	31.7	-	-	15.1**

MISSOURI RIVER BASIN

Beaverhead	Lima	84.0	45.5	16.4	25.6
Ruby	Ruby	38.8	-	-	15.7**
Madison	Hebgen Lake	384.8	220.8	211.3	188.0
	Ennis Lake	41.0	39.1	39.0	36.9
Gallatin	Middle Creek	8.0	3.5	2.8	3.0**
Missouri	Canyon Ferry	2,043.0	1,878.0	1,760.0	1,628.5**
	Hauser & Helena	61.9	62.4	60.7	55.5
	Lake Helena	10.4	10.7	10.0	8.3
	Holter Lake	81.9	67.6	70.8	71.2
	Smith River	10.7	8.1	7.3	5.0**
	Ackley Lake	5.8	-	-	3.8
	Durand	7.0	5.2	3.6	3.7**
	Martinsdale	23.1	7.6	8.2	7.6**
	Deadman's Basin	72.2	38.8	45.1	40.5**
	Fort Peck	19,410.0	15,810.0	12,010.0	10,661.1
	Gibson	105.0	40.2	14.9	52.5
	Willow Creek	32.3	15.5	20.8	18.8
	Pishkun	32.0	17.5	17.6	18.9
	Lower Two Medicine	16.6	-	1.2	0.3
Marias	Four Horns	19.2	-	-	10.5
	Swift	30.0	-	6.6	17.4
	Lake Francis	112.0	-	33.4	91.9
	Tiber	1,313.0	-	639.6	624.4**
Milk	Fresno	127.2	67.7	43.1	61.9
	Nelson	66.8	38.5	34.9	38.4
	Lake Sherburne	66.1	-	-	17.1
Yellowstone	Mystic Lake	20.8	15.1	13.8	13.9
	Tongue River	68.0	-	-	11.7
	Cooney	27.5	12.2	14.5	10.5**

1/ Sum of four small reservoirs on west side of Flathead Lake.

2/ Sum of eight small reservoirs in Mission Valley not including Jocko Lake.

Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service
Region I, Missoula, Montana

U. S. Geological Survey
Helena, Montana

U. S. Army Corps of Engineers
Portland, Oregon
Seattle, Washington
Omaha, Nebraska

U. S. Indian Irrigation Service
St. Ignatius, Montana

U. S. Weather Bureau
Helena, Montana

U. S. Bureau of Sports Fisheries
and Wildlife
Red Rock Lakes Refuge
Mojave, Montana

U. S. Bureau of Reclamation
Billings, Montana
Boise, Idaho

Montana Power Company
Butte, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

State Water Conservation Board
Helena, Montana

National Park Service
Yellowstone National Park
Glacier National Park

Montana Experiment Station
Montana State College
Bozeman, Montana

Bonneville Power Administration
Portland, Oregon

Montana State University
School of Forestry
Missoula, Montana

Soil Conservation Service
Montana, Wyoming, Idaho

Soil and Water Conservation Districts
Montana Counties

Johnson Flying Service, Inc.
Missoula, Montana

Water Rights Branch, Dept.
of Lands and Forests
Victoria, British Columbia

Department of Northern Affairs
and National Resources
Calgary, Alberta

State Engineer
Helena, Montana

Montana's **SNOW HARVEST**

SCENIC SNOW-FED ROCK CREEK, SOUTH OF
RED LODGE, NOTED FOR BOTH IRRIGATION
AND FISHING.

11-306



The Story of
**COOPERATIVE
FEDERAL! STATE - PRIVATE
SNOW SURVEYS AND
WATER SUPPLY FORECASTS**

INTO MOUNTAIN SNOW
PACK AREAS SURVEY-
ORS TRAVEL BY RADIO
EQUIPPED OVERSNOW
VEHICLES

11-9443-4

---OR AFOOT ON
SNOWSHOES OR
SKIS.



11-9357-3

MAPPED SNOW COURSES
THEY SEEK AND MEASURE
ARE MARKED BY YELLOW
SIGNS.

SSS-02

SNOW SURVEYORS CHECKING SNOW DEPTH AND
TAKING SAMPLE. SCALE ON SKI POLE WILL WEIGH
WATER CONTENT OF SNOW.

SS4-11



SNOW SURVEYS

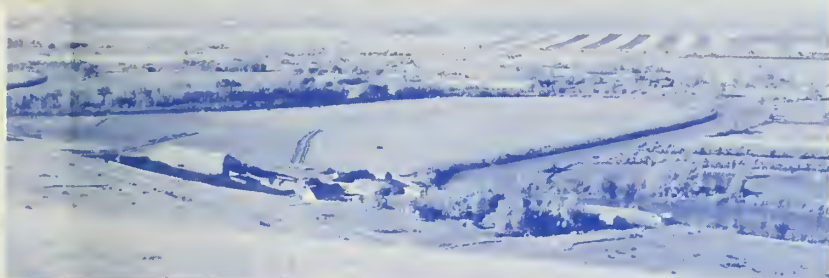
Montana's annual snow harvest is worth much -- even in terms of money. Considered by many a hindrance to travel, a menace to man and animal or a delightful medium for fun -- such as skiing -- snow is actually a major factor in Montana's economy.

Most water in the West has its beginning as a snowflake falling gently on a timbered watershed. It matures into a droplet and with other droplets may be used to generate electricity, irrigate crops, quench thirst, drive industry, provide habitat for fish, produce lumber or become part of a wilderness lake.

The supply of water varies year to year, depending on how much snow accumulates in higher elevations -- how great the winter snowpack becomes.

Each winter month, pairs of snow surveyors travel deep into mountain snowpack areas to measure snow accumulation at locations called "snow courses." With specially built aluminum tubes, they measure snow depth and remove a core of snow which is weighed to determine how much water it contains. Each such snow course usually has 10 sampling stations. Snow depth and snow water equivalent (water content) are averaged and this is reported as the measurement for the course.

The U.S. Department of Agriculture Soil Conservation Service has the responsibility for coordinating snow

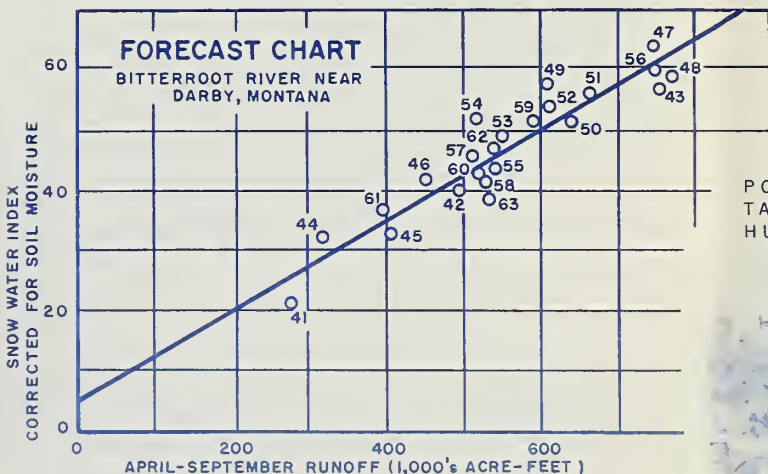


GOOD SOIL AND WATER MANAGEMENT BASED ON RELIABLE FORECASTS ARE EXEMPLIFIED BY THIS SUN RIVER FARM. 11-3066-4

SNOW SURVEY - BASED WATER FORECASTS AID PLANNING AND OPERATION OF RESERVOIRS SUCH AS THIS ON LOWER WILLOW CREEK. 11-7801-4



surveys in Montana. Assisting, either through funds or services are the Montana Agricultural Experiment Station, U.S. Forest Service, U.S. Geological Survey, U.S. Indian Irrigation Service, U. S. Bureau of Sport Fisheries and Wildlife, U.S. National Park Service, Montana Power Company, State Water Conservation Board, Montana State University School of Forestry and other private and public organizations.



POWER FROM A MIGHTY RIVER IS MORE PREDICTABLE AND MANAGEABLE THROUGH SNOW SURVEYS. HUNGRY HORSE DAM, FLATHEAD RIVER.

MEASUREMENTS OVER SEVERAL YEARS PROVIDE DATA WHICH CAN BE PLOTTED ON GRAPH FROM WHICH SEASONAL RUNOFF CAN BE PREDICTED.



STREAMFLOW FORECASTS

Snow survey data are used to forecast streamflow -- 70 to 80 per cent of the spring and summer runoff via mountain streams comes from snow melt. By consulting previous snow survey and streamflow records, trained personnel can make reliable estimates of a coming runoff as much as six months in advance. Measurements of soil moisture under the snowpack and subsequent precipitation add to accuracy of these predictions. Generally a forecast equation is developed by statistical methods for analyzing various types of data.

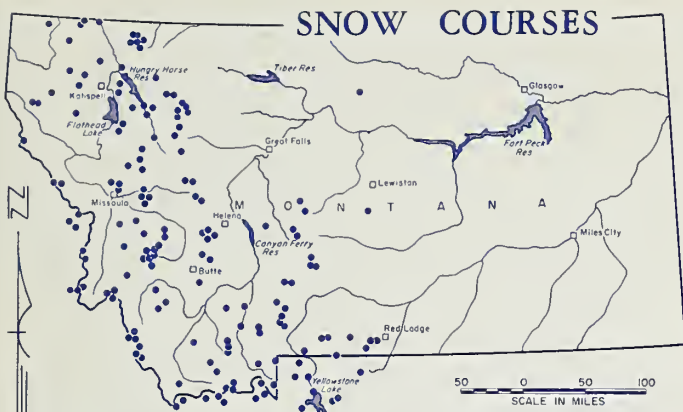
This information along with snow survey, soil moisture and reservoir storage data is published in water supply outlook reports and bulletins and mailed to water users and others interested in water supply.

Reports covering the entire state of Montana are published near the first of each month, January through June. Watershed reports covering smaller areas are published March 1, April 1 and May 1.

Reliable forecasts of spring and summer runoff help many Montanans directly and almost everyone indirectly. Reservoirs, whether for irrigation, power, flood control or multipurpose, operated on the basis of water supply forecasts, can bring about maximum use of both stored and runoff water volumes. Farmers can determine, beforehand, which crop plantings are most suitable for the water supply available. Transportation companies can anticipate production from irrigated lands -- and hence the transportation requirements. Others, including agricultural loan firms and agencies, municipal water supply agencies and power generating companies or districts can plan operations to fit the expected supply of water.

Of all natural resources in Montana, water is one of the most valuable -- and the snowpack is major source of that water. Snow surveys provide invaluable advance information on each year's potential supply.

Current information on snow survey and water supply forecasting is available from the Snow Survey Supervisor, Box 855, Bozeman, Montana.



MONTANA'S 125 SNOW COURSES AND 20 SOIL MOISTURE STATIONS PROVIDE DATA FOR STREAMFLOW FORECASTS. . 11-799



U.S.
Department of Agriculture
SOIL CONSERVATION
SERVICE

33 E. Mendenhall
BOZEMAN, MONTANA

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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FEDERAL - STATE - PRIVATE
COOPERATIVE SNOW SURVEYS

Furnishes the basic data
necessary for forecasting
water supply for irrigation,
domestic and municipal water
supply, hydro-electric power
generation, navigation,
mining and industry

*"The Conservation of Water begins
with the Snow Survey"*